PANAMETRICS

BWT™ System Installation Guide

February 2002

Process Control Instrument Division

BWT™ System Installation Guide

User's Guide *916-058A*

PANAMETRICS

Table of Contents

Chapter 1: General Information

Introduction 1-1
Types of BWT Buffers. 1-1
General Guidelines for Transducer Position and Location 1-2
BWT Flowcells 1-3
Single-Traverse Flowcells. 1-3
Multiple-Traverse Flowcells 1-4
Handling and Installing a Spoolpiece 1-5
Unpacking a Spoolpiece 1-5
Installing a Spoolpiece 1-5
Welding Requirements. 1-6
Spoolpiece Requirements When Flushing. 1-7

Chapter 2: Installing Standard BWT Buffers (FTPA) and Transducers

Identifying and Checking Components 2-1
Assembling the Standard BWT Buffer 2-3
Inserting the Standard BWT Buffer. 2-4
Torquing the Studs 2-6
Installing the BWT Transducer 2-9

Chapter 3: Installing Acoustic Isolation BWT Buffers (FIPA) and Transducers

Identifying and Checking Components 3-1
Inserting the Acoustic Isolation BWT Buffer 3-3
Torquing the Studs 3-7
Installing the BWT Transducer 3-11
Installing Additional Acoustic Isolation 3-13

Chapter 4: Installing Non-Flanged BWT Buffers (FSPA) and Transducers

Installing Non-Flanged BWT Buffers and Transducers 4-1

Chapter 1

General Information

Introduction 1-1

Types of BWT Buffers 1-1

General Guidelines for Transducer Position and Location 1-2

BWT Flowcells 1-3

Handling and Installing a Spoolpiece. 1-5

Welding Requirements 1-6

Spoolpiece Requirements When Flushing 1-7

Introduction

Installing the BWT™ System consists of creating a flowcell, installing the transducer buffer, and then mounting transducers into the buffer. Panametrics offers a variety of buffers and flowcells for your application. This sections consists of general information for the following:

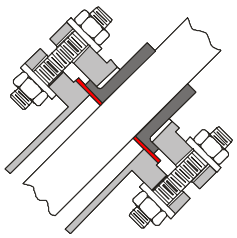
- Types of BWT Buffers
- General Guidelines for Transducer Position and Location
- BWT Flowcells
- Handling and Installing a Spoolpiece
- Welding Requirements
- Spoolpiece Requirements when Flushing

Refer to the appropriate section of this manual to install the BWT buffers and transducers that you ordered.

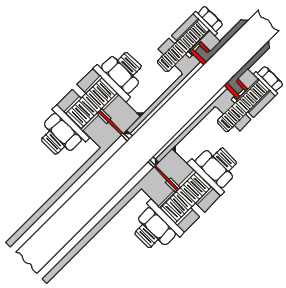
Types of BWT Buffers

Buffers are used to protect the BWT transducers from temperature extremes. Since they mount directly into the pipe coupling or nozzle, they also act as barriers against the process, making it possible for the transducers to be removed without interrupting the process or emptying the pipe. There are three BWT buffer types available for transducers for liquid and gas applications:

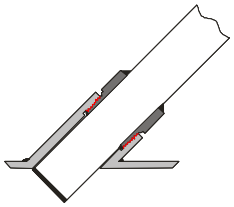
- Standard BWT Buffer (part number FTPA) - is used for liquid and gas applications. The buffer has a flanged process connection and is available in two lengths: 2 in. (temperatures up to 600°F/315°C) and 6 in. (temperatures up to 1,100°F/600°C).



- Acoustic Isolation BWT Buffer (part number FIPA) - is used for gas applications at lower pressures. The buffer has a flanged isolation section that reduces acoustic short circuit. The buffer has a flanged process connection and is available in two lengths: 2 in. (temperatures up to 600°F/315°C) and 6 in. (temperatures up to 1,100°F/600°C).



- Non-Flanged BWT Buffer (part number FSPA) - is used in liquid applications and has a 1 in. NPT thread or socket-weld connection.



General Guidelines for Transducer Position and Location

Whichever transducer type is selected for your installation, flowmeter accuracy depends on proper transducer location, spacing, alignment, and electronics programming. However, even though every transducer installation has specific location considerations, the following location guidelines apply to all transducers, regardless of type:

Caution!
A flowmeter's accuracy and performance depends on the location, spacing, and alignment of the transducers. The specific spacing of your transducers are unique to your installation.

1. To help assure a uniform flow profile, locate the flowcell so that there are at least 10 pipe diameters of straight, undisturbed flow upstream and 5 pipe diameters of straight, undisturbed flow downstream from the point of measurement. Measure the distance from the center of the transducer at the pipe wall ID. "Undisturbed flow" means avoiding sources of turbulence such as valves, flanges, elbows; avoiding swirl; and avoiding cavitation.

2. It is important to locate the transducers on a horizontal plane. This specifically applies to mounting transducers on a horizontal pipe. One transducer cannot be on top of the pipe and one on the bottom, because the top of the pipe tends to accumulate gas and the bottom tends to accumulate sediment. These contaminants can attenuate or block the ultrasonic signal. There is no similar restriction with vertical pipes. To ensure a full pipe, however, you should avoid vertical downward flow. When using a wetted installation, extended-well type transducers are preferred to keep the transducer face free from gas or sediment that may tend to get trapped in the transducer port.

BWT Flowcells

BWT installations typically use a tilted-diameter flowcell. A tilted-diameter flowcell is so named because the transducers send their pulses at a 45^{o} angle across the diameter (or other chord) of the pipe. This type of flowcell can be configured as a single-traverse or multiple-traverse installation.

Note: *The mounting angle for the transducer is typically 45°, but other angles (20°, 30°, or 60°) can be used as required. Tilted diameter can also refer to paths that are off-diameter such as the mid-radius path.*

A flowcell is created by mounting the nozzles on the existing pipeline, or on a **spoolpiece**. A spoolpiece is a precision-manufactured section of matching pipe that contains the ports where the transducer buffers will be mounted. This setup allows more accurate transducer alignment before mounting the spoolpiece into the pipeline. If requested, a spoolpiece can be calibrated prior to shipment. All spoolpieces are factory-supplied.

Single-Traverse Flowcells

A single-traverse configuration consists of two transducers mounted on opposite sides of the pipe so that the signal they transmit passes through the fluid just once, at a typical 45° angle (Figure 1-1 below). A single-traverse configuration may include more than one path (Figure 1-2 on the next page).

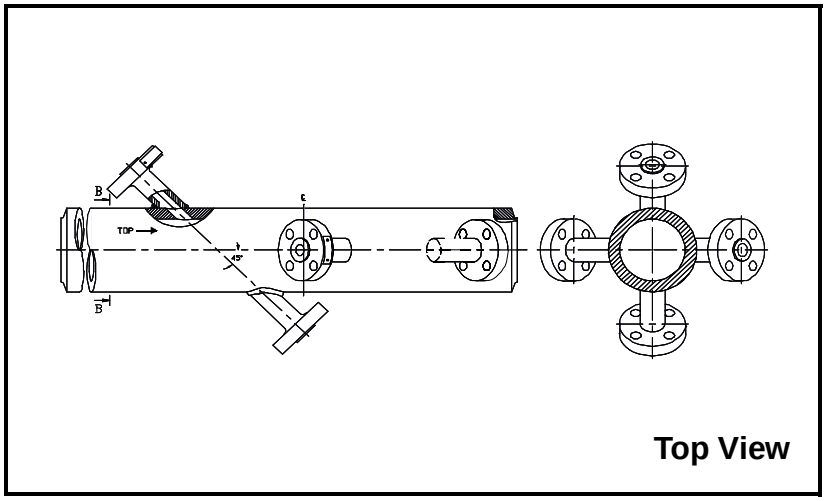


Figure 1-1: Single-Traverse, 2-Path, Diagonal 45 Flowcell

Single-Traverse Flowcells (cont.)

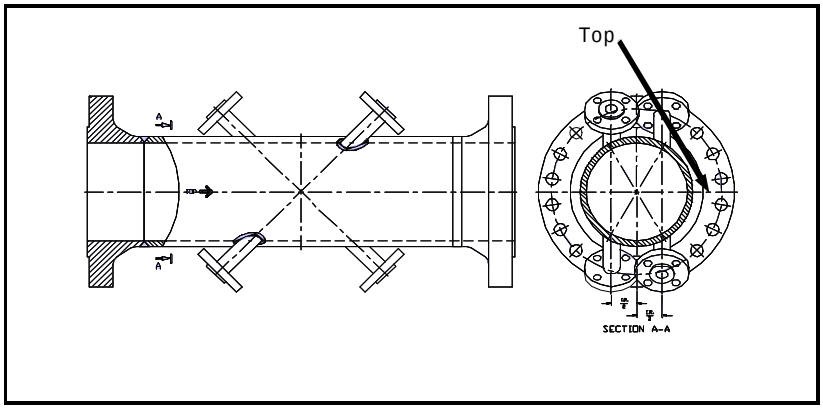


Figure 1-2: Single-Traverse, 2-Path, Mid-Radius Flowcell

Multiple-Traverse Flowcells

A multiple-traverse configuration consists of two transducers mounted on the pipe so that the signal traverses the fluid two or more times before reaching the other transducer. See Figures 1-3 and 1-4 below.

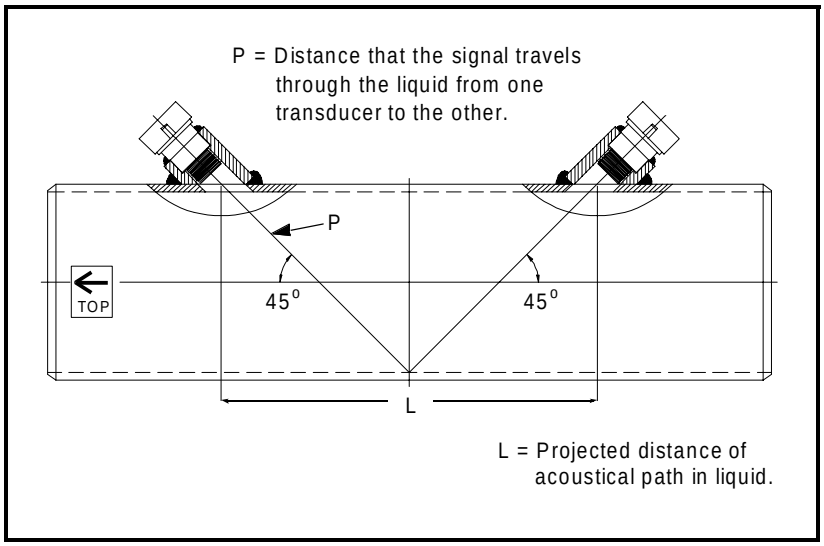

P = Distance that the signal travels through the liquid from one transducer to the other.
P
TOP
45°
45°
L
L = Projected distance of acoustical path in liquid.

Figure 1-3: Double-Traverse Flowcell

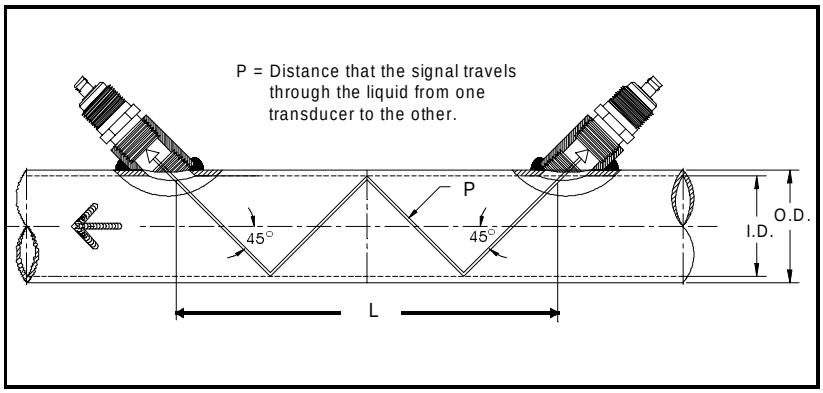


Figure 1-4: Multiple-Traverse Flowcell (Four Traverses)

Handling and Installing a Spoolpiece

To ensure proper nozzle alignment, Panametrics uses the highest quality welding and machining techniques when manufacturing spoolpieces. Since proper alignment of the nozzles is important to making accurate flow measurement, great care must be taken when unpacking and installing the spoolpiece.

Unpacking a Spoolpiece

Upon receipt, you should take great care in unpacking the spoolpiece. Although spoolpieces are constructed of steel, improper unpacking or handling can result in damage or affect nozzle alignment. Use the guidelines below for unpacking the spoolpiece:

- Typically, spoolpieces intended for BWT systems are shipped with the buffers already installed in the nozzles. Take care as to not disturb the buffers.
- Since the nozzles protrude from the pipe, take care when removing packing material and the spoolpiece from its shipping container, so as not to disturb the nozzles.
- After the spoolpiece is removed from its shipping container, never allow the full weight of the spoolpiece to rest on the nozzle or buffer. You should prop the spoolpiece up to prevent it from rolling over, which again, may cause damage or misalignment of nozzles.
- Do not let the spoolpiece hit against other objects or surfaces. Nozzle alignment can be affected if the spoolpiece is dropped onto the ground or on a surface as soft as sand.

Installing a Spoolpiece

Spoolpieces can be either flanged or welded into the existing pipeline. Use the following steps to position the spoolpiece into the pipeline (refer to Figure 1-5 on the next page):

!WARNING!
Before installing the spoolpiece make sure pipe flushing is completed. For additional information when flushing is necessary, refer to *Spoolpiece Requirements When Flushing* on page 1-7.

1. Find the tag plate with the words TOP and FLOW DIRECTION marked on it. If the spoolpiece is flanged, two bolt holes should straddle the vertical centerline.

IMPORTANT: *In general (including cases where the spoolpiece axis is not horizontal), be sure that the installation does not allow gas or sediment to deposit in the transducer ports. Otherwise the sound waves could be attenuated or blocked entirely.*

Installing a Spoolpiece (cont.)

2. Place the spoolpiece in the pipeline so that the FLOW DIRECTION arrow mark is in the direction of flow and the top is appropriately located. (Be sure the transducer ports are in a horizontal plane.)

IMPORTANT: *If you cannot place the spoolpiece in the required orientation, consult the factory; otherwise operational problems may occur.*

3. Do one of the following:

   - Bolt the spoolpiece into place and proceed to the appropriate section that follows to mount the BWT buffers and transducers.
   - Weld the spoolpiece into place in accordance with the requirements described in *Welding Requirements* below. Once welding is completed, proceed to the appropriate section that follows to mount the BWT buffers and transducers.

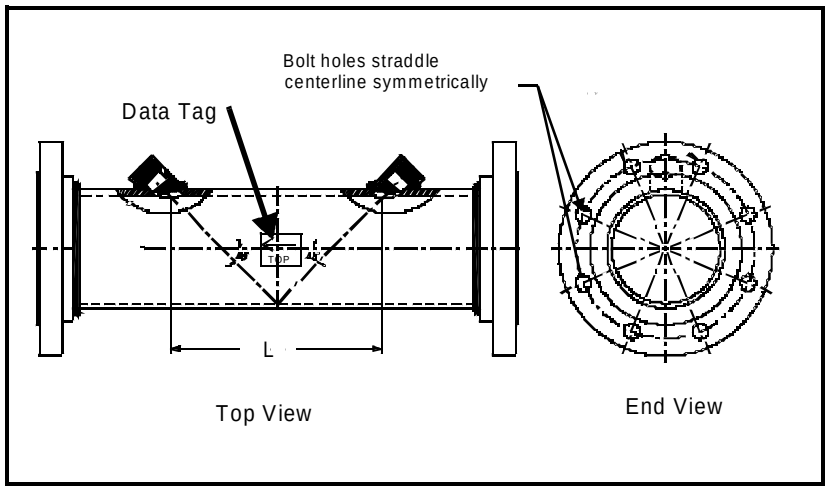


Figure 1-5: Top View of a Flanged Spoolpiece

Welding Requirements

Prior to welding, do the following:

- Remove power from the flowmeter console and disconnect the cables from the transducers.
- Make sure the inside diameter of the spoolpiece and process pipe are properly aligned. Misalignment can affect measurement accuracy.

Spoolpiece Requirements When Flushing

Panametrics strongly recommends using a dummy spoolpiece during flushing operations; otherwise, damage may occur because of the following reasons:

- Fast moving solid objects in the flowing medium could damage the buffer faces.
- Flushing residue/sediment could clog nozzles.

In the event that a dummy spoolpiece is not available for flushing operations, remove the buffers and plug the hole properly for the temperature and pressure used.

Reinstall the buffers and transducers after flushing using the information in this guide.

Chapter 2

Installing Standard BWT Buffers (FTPA) and Transducers

Identifying and Checking Components 2-1

Assembling the Standard BWT Buffer 2-3

Inserting the Standard BWT Buffer 2-4

Torquing the Studs. 2-6

Installing the BWT Transducer 2-9

Identifying and Checking Components

Caution!
It is critical that you follow the instructions outlined in this document. If you do not, Panametrics cannot ensure the proper operation of your equipment.

Before you install the Standard BWT™ Buffer (FTPA) you should make sure you have all the needed equipment. Use the lists below to identify the needed components. Panametrics will supply you with the following (use Figures 2-1 and 2-2 on the next page to help you identify each component):

Note: *The list below is for a one-path installation.*

- 2 Standard BWT Buffers (FTPAs)
- 2 BWT1 transducers
- 2 Kamprofile gaskets

IMPORTANT: *Kamprofile gaskets must be used for two reasons: they ensure a leak tight seal and they provide sufficient acoustic isolation.*

- 2 Mating lap-joint flanges
- 2 Junction boxes
- 2 Preamplifiers - for gas only
- 3M epoxy or equivalent (for permanent bond) *(not shown in photo)*
- Required studs, nuts and washers *(not shown in photo)*
- 10 ft (3 m) Coaxial cable with BNC connectors *(not shown in photo)*
- Additional cable to connect preamplifier to electronics - for gas only *(not shown in photo)*

You will need to supply the following:

- Copperslip (SS316), Molykote grease P47 (CS) or equivalent
- Adjustable socket drive torque wrench with 15 - 148 ft-lb range (20 - 200 N-m)
- 1 in. deep socket
- 12 in. adjustable wrench
- Steel wool
- Calipers

Identifying and Checking Components (cont.)

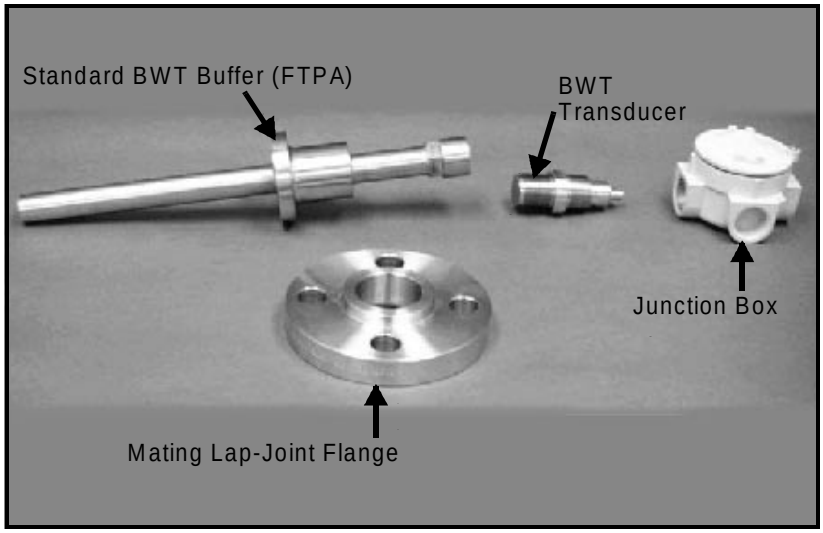


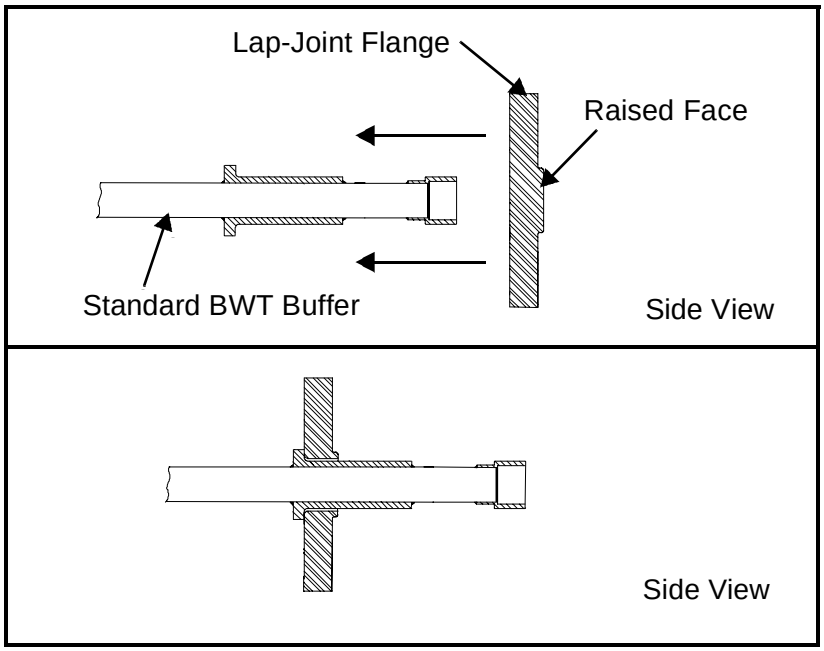
Figure 2-1: Components for Standard BWT Buffer (FTPA)

Figure 2-2: Gaskets

Assembling the Standard BWT Buffer

Note: *Typically, spoolpieces intended for BWT systems are shipped with the buffers already installed in the nozzles. If this is the case, proceed to* Installing the BWT Transducer *on page 2-9.*

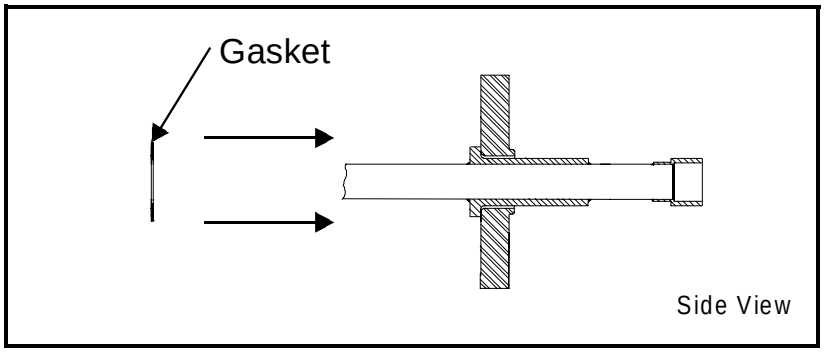
1. Slide the lap-joint flange over the Standard BWT Buffer. Make sure you orient the flange as shown below.



2. Check the raised face of the spool nozzle flange to make sure it is free from paint, rust, dirt, corrosion, and damage. If necessary, clean the raised faces with steel wool. In addition, clean the buffer flange if you are reusing the buffer.

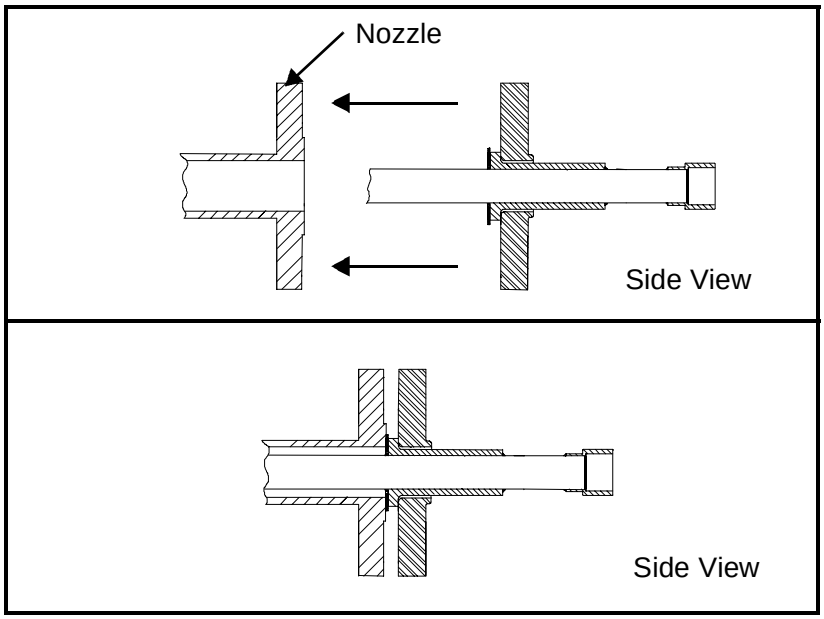
3. Inspect the Panametrics-supplied gaskets. They must not be used, warped, pitted or scratched.

4. Place one gasket on the end of the buffer assembly.

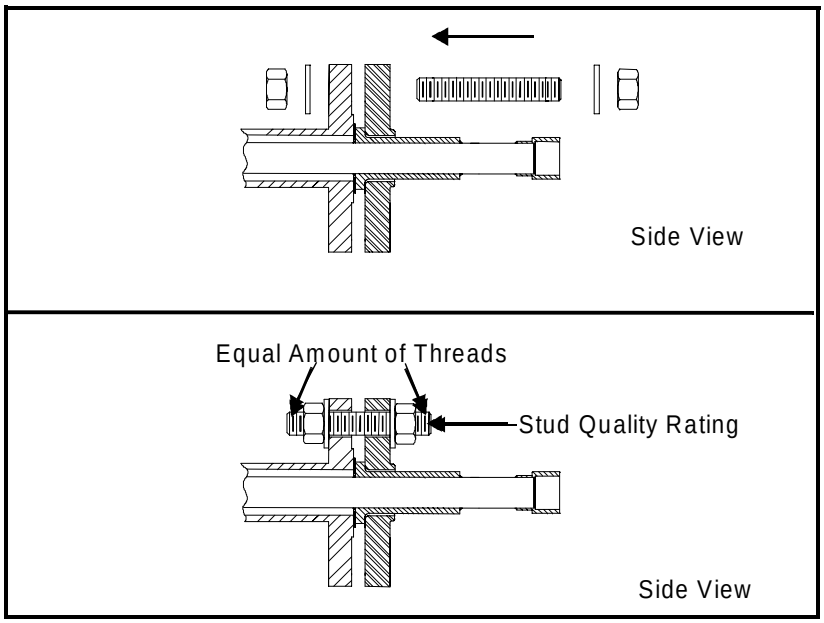


Inserting the Standard BWT Buffer

1. Inspect the pipe nozzle. Make sure it is free from dirt/rust. Use the steel wool to clean the pipe nozzle if necessary.
2. Insert the buffer assembly into the nozzle.

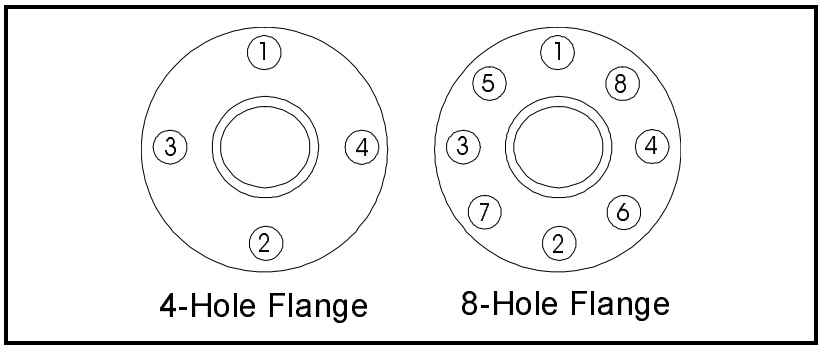


3. Apply Copperslip, Molykote or equivalent on the first several threads at both ends each stud.
4. Insert one stud through the flanges. Make sure the stud quality rating (e.g., B7) is facing away from the spoolpiece. Hand-tighten a washer and nut on to each end of the stud. Make sure you leave an equal number of threads exposed on each end of the stud.



Inserting the Standard BWT Buffer (cont.)

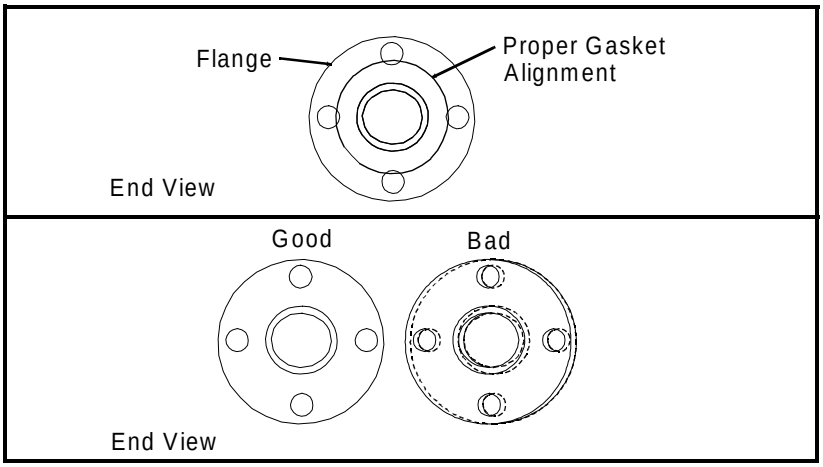
5. Install the remaining studs in the order shown below, but **do not** tighten the nuts yet.



6. Center the buffer in the middle of the nozzle. Feel 360 degrees around the flanges to ensure equal spacing, by placing your hands around the diameter of the buffer flange and the nozzle flange.

7. Then align the flanges as shown below.

IMPORTANT: *Make sure the gasket is in the center of the flanges.*



8. Once you have centered the buffer, tighten the nuts and studs further by hand to maintain the centering. Visually inspect that the buffer is centered in the lap joint flange; if necessary, adjust the buffer by hand until it is centered.

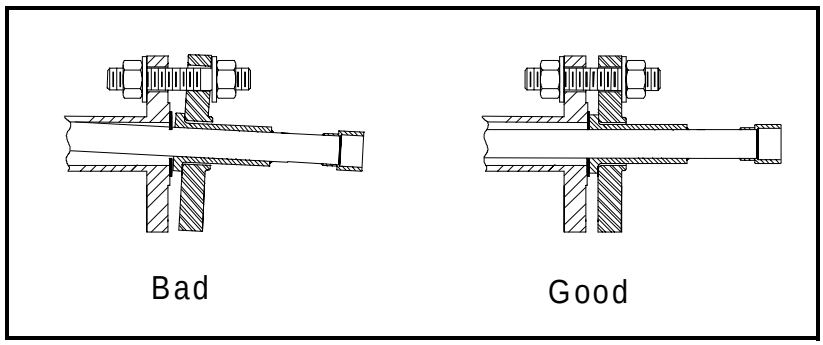
Torquing the Studs

Use one of the following sub-sections to properly torque the flange studs. You must torque the studs to give a good seal. However, you should not over-torque them so as to cause an acoustic short or change the transducer alignment.

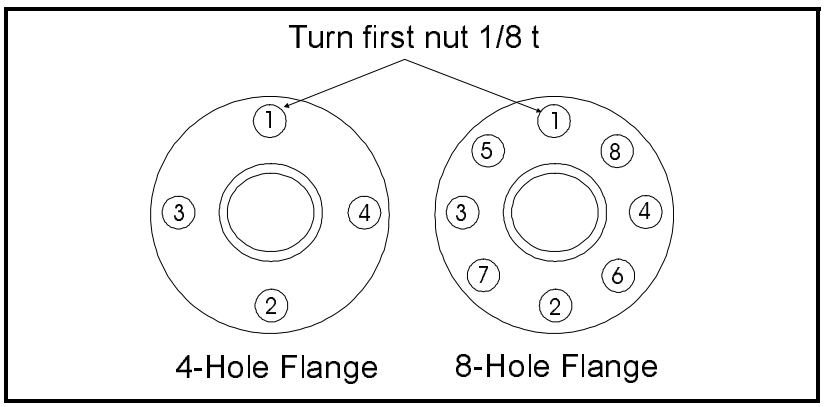
Liquid Applications
Use the recommended torque according to the flange and gasket ratings. Make sure you torque the studs evenly.

Gas Applications
The studs must be tightened and torqued in stages as described below.

1. Check the flange and buffer alignment again. Make sure the flanges are consistently parallel to each other.



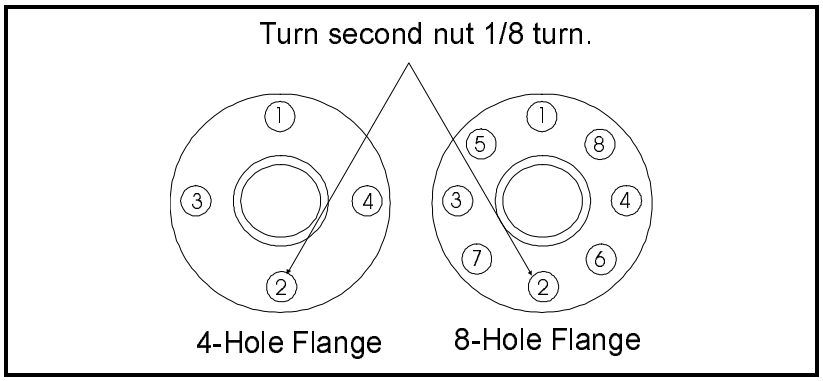
2. Using an adjustable wrench, turn the first nut 1/8 turn.



Torquing the Studs (cont.)

Gas Applications (cont.)

3. Turn the second nut 1/8 turn. The second stud should be diametrically opposite the first stud. Proceed to tighten the remaining studs in the order shown below, or in a similar manner.



4. Turn each nut an additional 1/8 turn. TURN NUTS IN SEQUENCE.

5. Use Table 2-1 to determine the appropriate torque.

Table 2-1:
Recommended Torque (using Kamprofile Gaskets)

Flange Rating	Stud Rating 4 Studs/ Flange	Stud Diameter (in.) x Length (in.)	Torque ft-lb (N-m)
316 Stainless Steel			
1 1/2" ANSI 150#	B8M,C,1	1/2" x 3 1/4"	56 (76)
1 1/2" ANSI 300#	B8M,C,1	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 600#	B8M,C,1	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 900#	B8M,C,1	1" x 6 "	107 (145)
1 1/2" ANSI 1500#	B8M,C,1	1" x 6"	107 (145)
Carbon Steel			
1 1/2" ANSI 150#	B7	1/2" x 3 1/4"	56 (76)
1 1/2" ANSI 300#	B7	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 600#	B7	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 900#	B7	1" x 6 "	107 (145)
1 1/2" ANSI 1500#	B7	1" x 6"	107 (145)

Torquing the Studs (cont.)

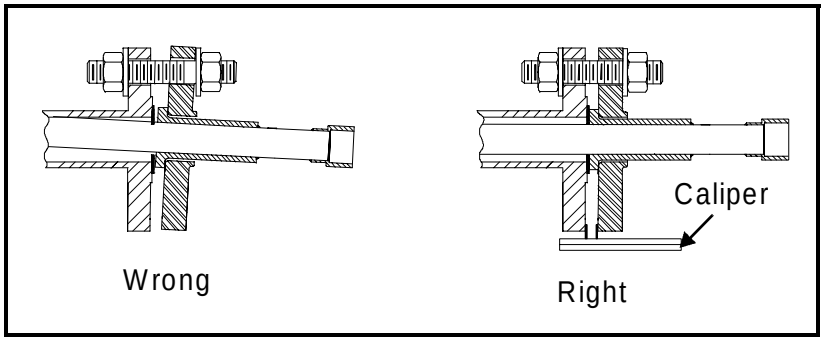
Gas Applications (cont.)

6. You must torque the flange studs in three steps. Divide the appropriate torque by 3 to determine the three torque settings. For example, if the appropriate torque is 90 ft-lb, the three steps would be 30, 60, and 90 ft-lb.

7. Set the torque wrench for the first setting and torque the studs in sequence.

8. Repeat Step 7 with the second and third torque settings.

9. Check the flange alignment again to ensure that the flanges are parallel to each other. Measure the spacing between the flanges with the caliper on at least four equally distant points; the maximum tolerance is 0.2 mm difference between the four points. If you cannot achieve a tolerance of 0.2 mm or less, replace the gasket with a new gasket, and repeat the entire procedure.



10. Repeat the above steps for additional flanges.

Installing the BWT Transducer

Please read the following steps before installing the BWT transducer.

IMPORTANT: *After you install the BWT transducers, you must allow the epoxy to cure for eight hours.*

Liquid Applications

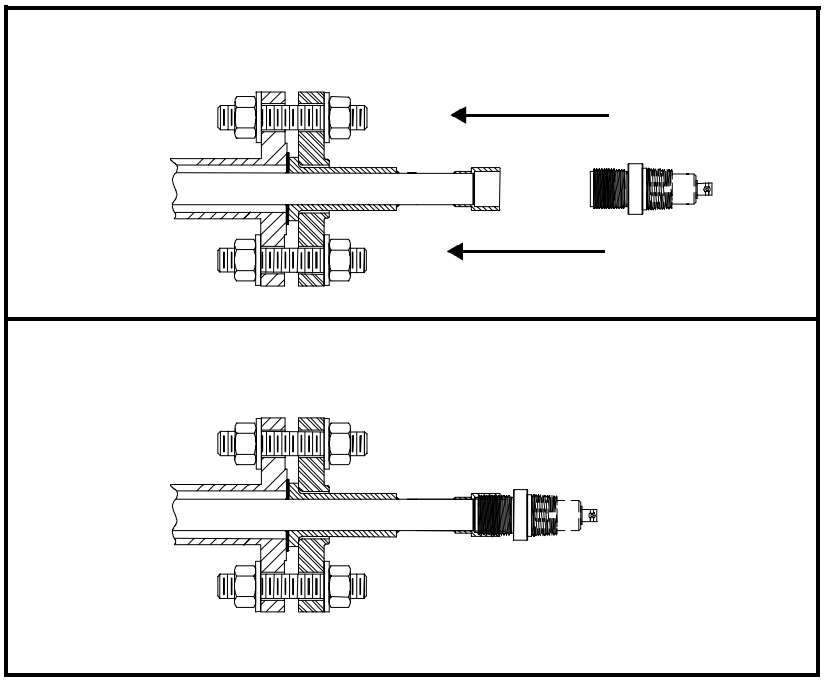
Simply install the transducer into the Standard BWT Buffer using a couplant.

Gas Applications

Note: *The typical minimum pressure should be 5 barg (75 psig) to see a signal at all. A higher pressure should give a better signal to noise ratio.*

1. Place a small droplet (2 mm in diameter) of 3M Epoxy or equivalent on the center of the end of the transducer.
2. Screw the BWT transducer into the receptacle fitting at the end of the Standard BWT Buffer. When the transducer begins to feel tight, stop turning it. Wait for a few seconds to give the couplant a chance to spread out.

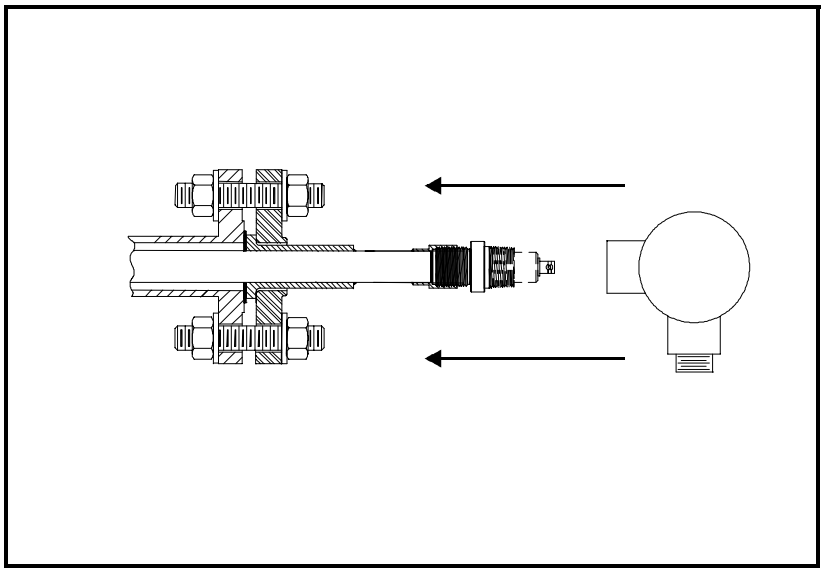
.



3. Torque the transducer 15 to 18 ft-lb (20 to 25 N-m). DO NOT OVERTIGHTEN.

Installing the BWT Transducer (cont.)

4. Screw the junction box onto the end of the BWT transducer.



5. Connect the transducer to the preamplifier and electronics as described in your user's manual.

6. Let the epoxy cure for 8 hours.

IMPORTANT: *After you install the Standard BWT Buffers and transducers, you must allow the epoxy to cure for 8 hours. You can power up the electronics; however, do not remove, re-torque or adjust the transducers.*

Verify that the measurements are the same or better after 8 hours, with the flowmeter diagnostics.

Caution!
Do not place insulation on or around the flange or buffer. The flange and buffer act as a barrier that protects the BWT from high temperatures.

Chapter 3

Installing Acoustic Isolation BWT Buffers (FIPA) and Transducers

Identifying and Checking Components 3-1

Inserting the Acoustic Isolation BWT Buffer 3-3

Torquing the Studs. 3-7

Installing the BWT Transducer 3-11

Installing Additional Acoustic Isolation 3-13

Identifying and Checking Components

Caution!

It is critical that you follow the instructions outlined in this document. If you do not, Panametrics cannot ensure the proper operation of your equipment.

Before you install the BWT transducers you should make sure you have all the needed equipment. Use the list below to identify the needed components. Panametrics will supply you with the following (see Figures 3-1 and 3-2 on the next page to help you identify each component):

Note: *The list below is for a one-path installation.*

- 2 Acoustic Isolation BWT Buffers (FIPA) - *fully assembled*
- 2 BWT1 transducers
- 2 Kamprofile gaskets

IMPORTANT: *Kamprofile gaskets must be used for two reasons: they ensure a leak tight seal and they provide sufficient acoustic isolation.*

- 2 Mating lap-joint flanges
- 2 Junction boxes
- 2 Preamplifiers - for gas only
- 3M epoxy or equivalent (for permanent bond) *(not shown in photo)*
- Required studs, nuts and washers *(not shown in photo)*
- 10 ft (3 m) Coaxial cable with BNC connectors *(not shown in photo)*
- Additional cable to connect preamplifier to electronics - for gas only *(not shown in photo)*

You will need to supply the following:

- Copperslip (SS316), Molykote grease P47 (CS) or equivalent
- Adjustable socket drive torque wrench with 15 - 148 ft-lb range (20 - 200 N-m)
- 1-in., deep socket
- 12-in. adjustable wrench
- Steel wool
- Calipers
- Tape measure

Identifying and Checking Components (cont.)

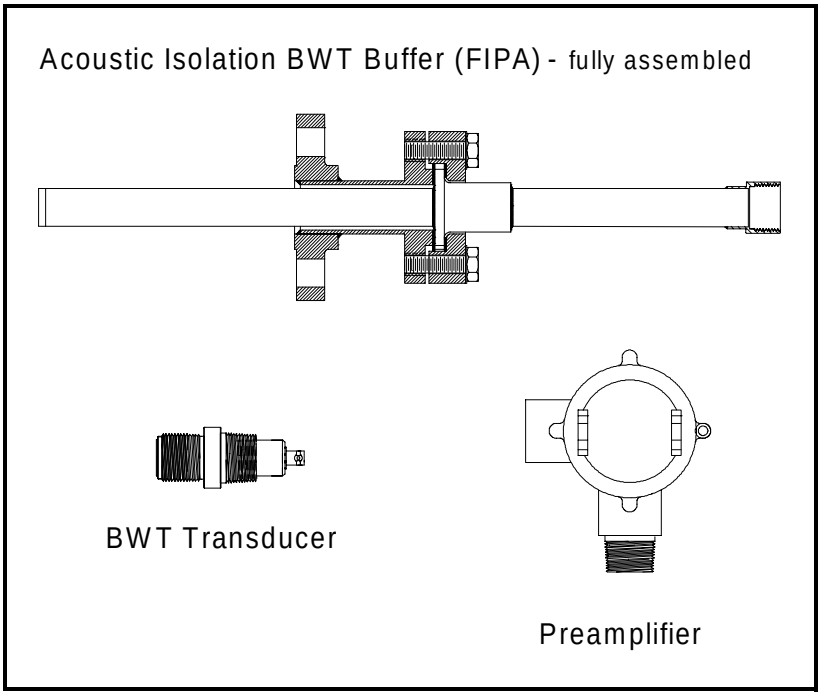


Figure 3-1: Components for Acoustic Isolation BWT Buffer (FIPA)

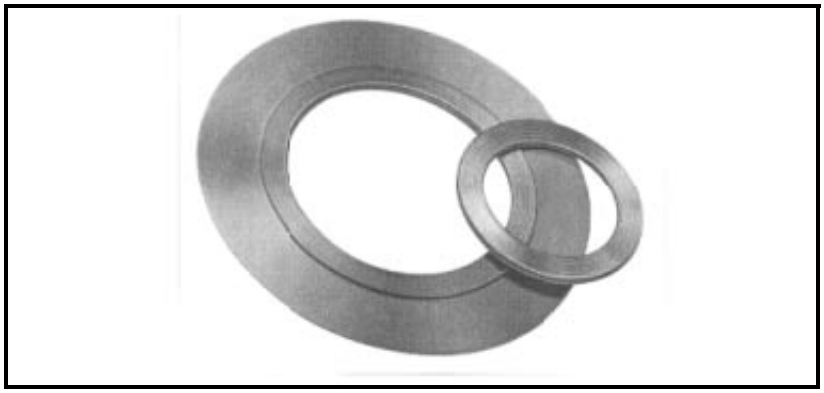


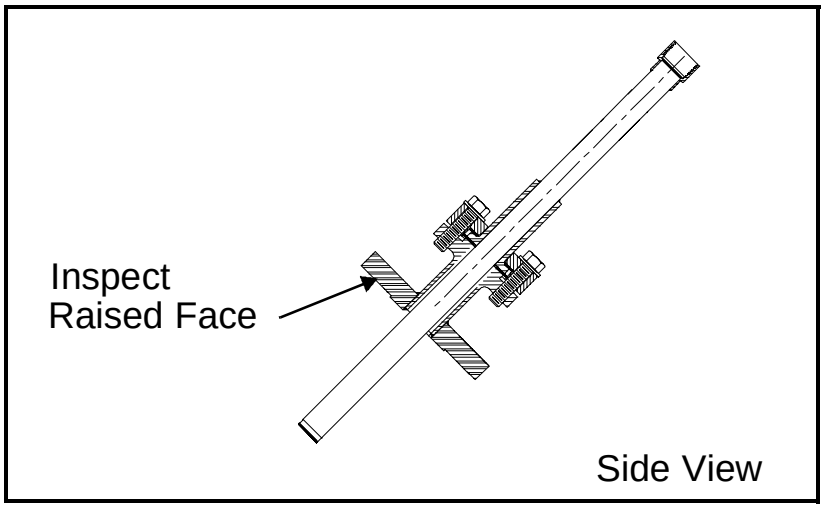
Figure 3-2: Gaskets

Inserting the Acoustic Isolation BWT Buffer

When you receive the Acoustic Isolation BWT Buffer it will be fully assembled. Use the steps below to properly install the buffer.

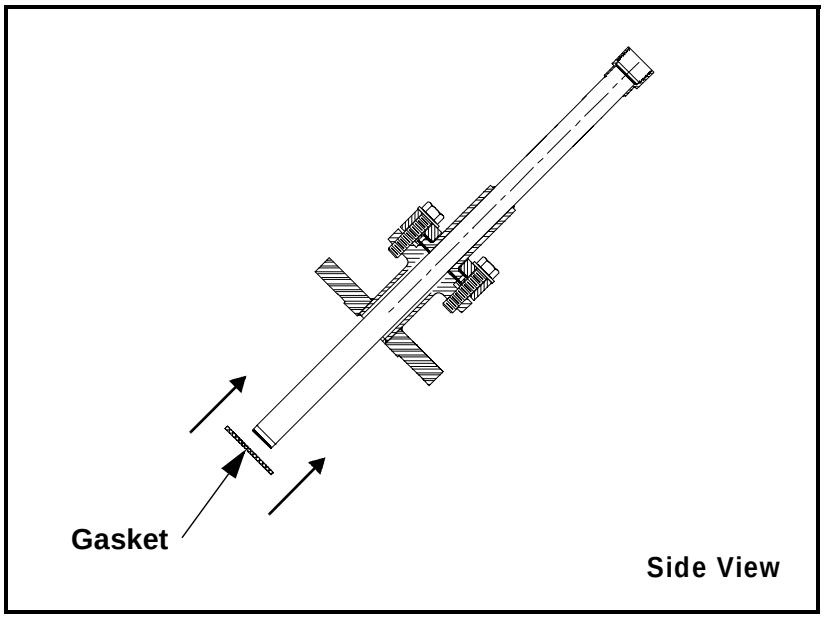
Note: *Typically, spoolpieces intended for BWT systems are shipped with the buffers already installed in the nozzles. If this is the case, proceed to* Installing the BWT Transducer *on page 3-11*.

1. Check the raised face of the spool nozzle flange to make sure it is free from paint, rust, dirt, corrosion, and damage. If necessary, clean the raised faces with steel wool. In addition, clean the buffer flange if you are reusing the buffer.



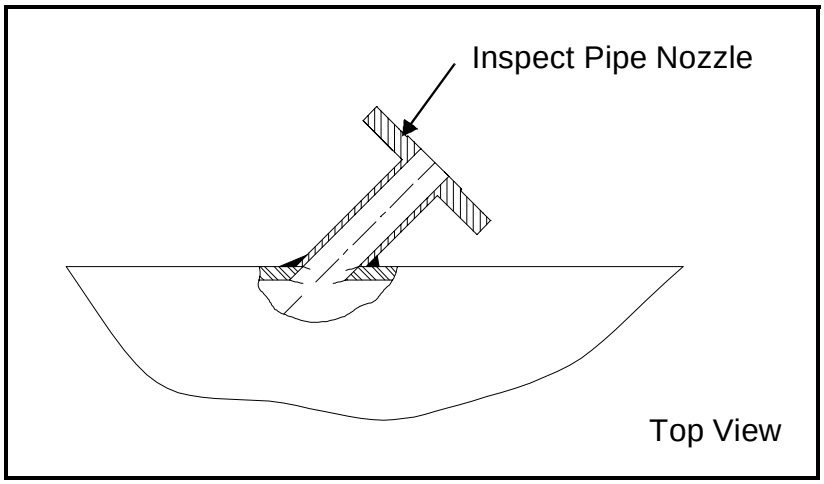
2. Inspect the Panametrics-supplied gaskets. They must not be used, warped, pitted or scratched.

3. Place one gasket on the end of the buffer.

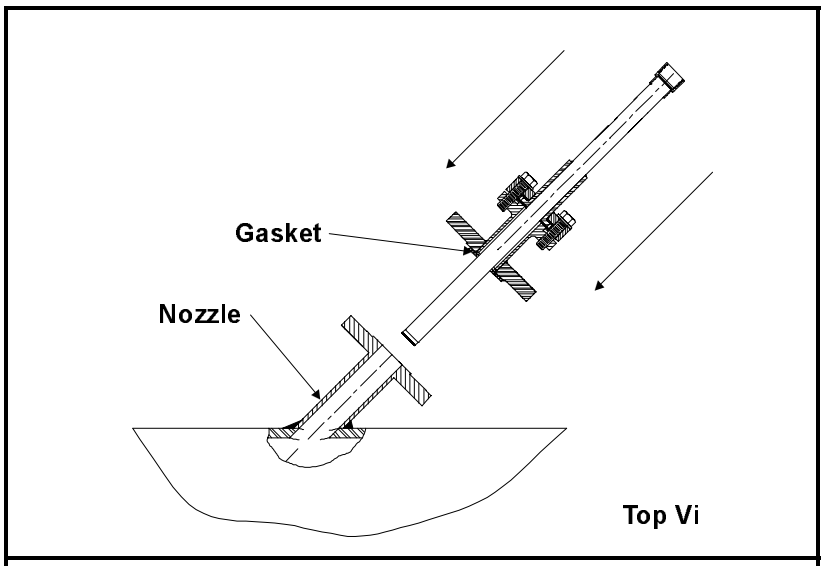


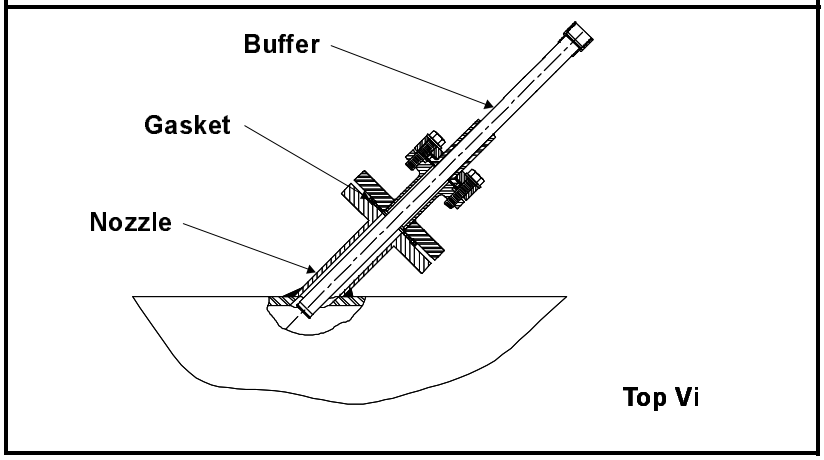
Inserting the Acoustic Isolation BWT Buffer (cont.)

4. Inspect the pipe nozzle. Make sure it is free from dirt/rust. Use the steel wool to clean the pipe nozzle if necessary.



5. Insert the buffer into the nozzle.

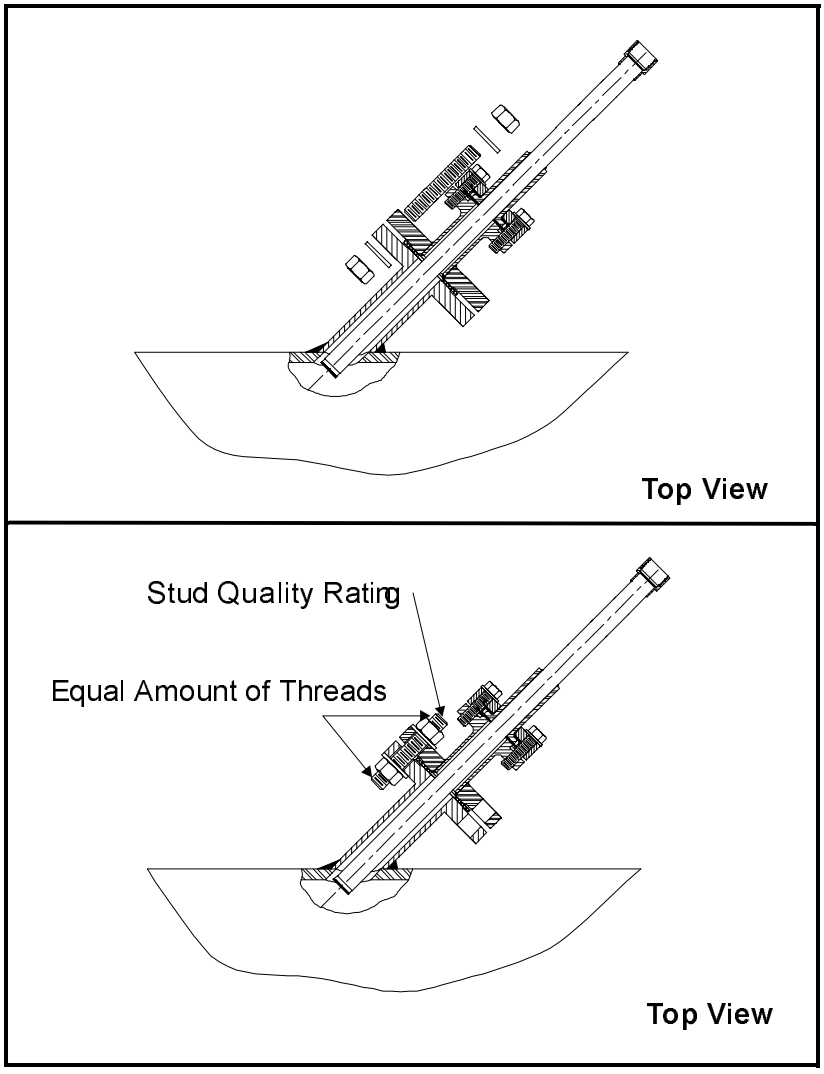




Inserting the Acoustic Isolation BWT Buffer (cont.)

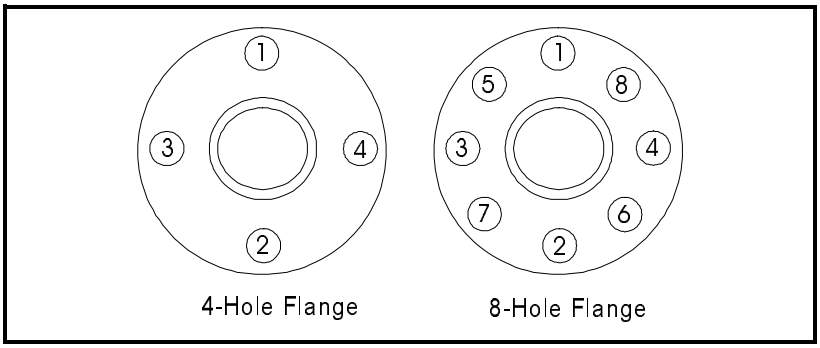
6. Apply Copperslip, Molykote or equivalent on the first several threads at both ends each stud.

7. Insert one stud through the flanges. Make sure the stud quality rating (e.g., B7) is facing away from the spoolpiece. Hand-tighten a washer and nut on to each end of the stud. Make sure you leave an equal number of threads exposed on each end of the stud.



Inserting the Acoustic Isolation BWT Buffer (cont.)

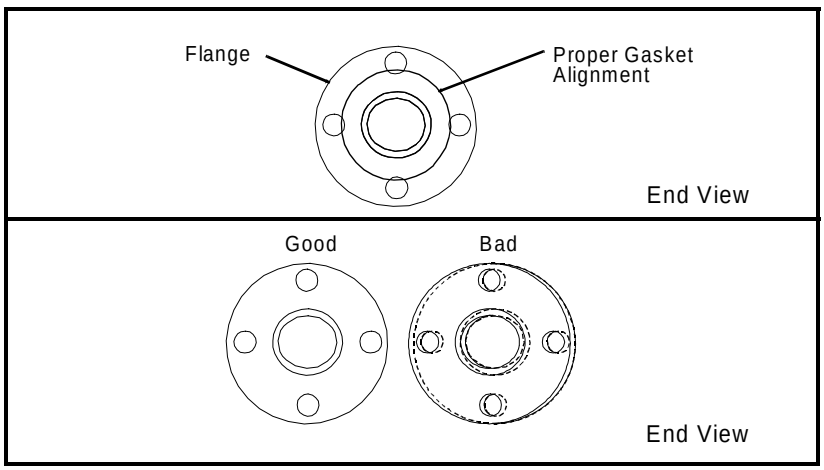
8. Install the remaining stud in the order shown below, but **do not** tighten the nuts yet.



9. Center the buffer in the middle of the nozzle. Feel 360 degrees around the flanges to ensure equal spacing, by running your hands around the diameter of the buffer flange and the nozzle flange.

10. Then align the flanges as shown below.

IMPORTANT: *Make sure the gasket is in the center of the flanges.*



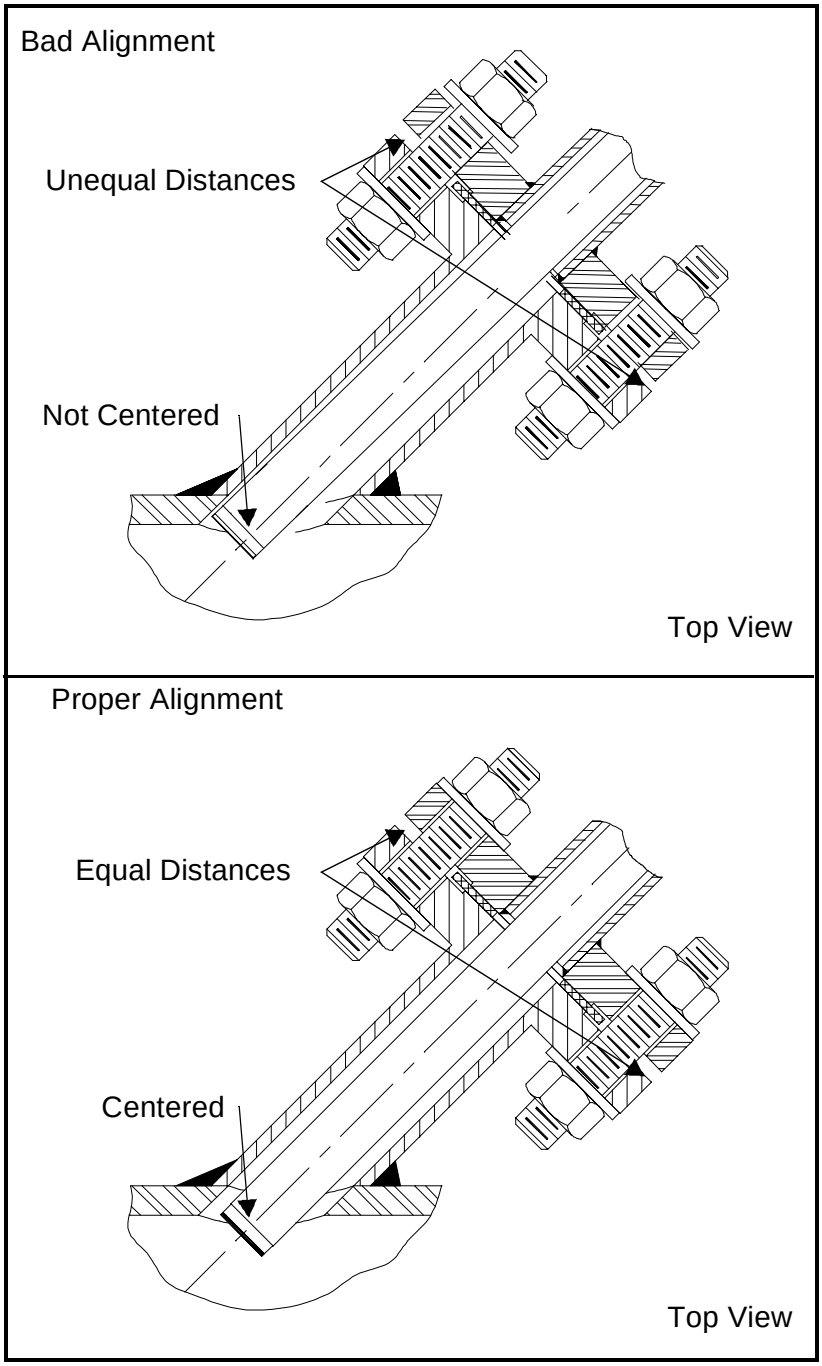
11. Once you have centered the buffer, tighten the studs further by hand to maintain the centering. Visually inspect that the buffer is centered in the lap joint flange; if necessary, adjust the buffer by hand until it is centered.

Torquing the Studs

You must torque the studs to give a good seal. However, you should not over torque them so as to cause an acoustic short or change the transducer alignment.

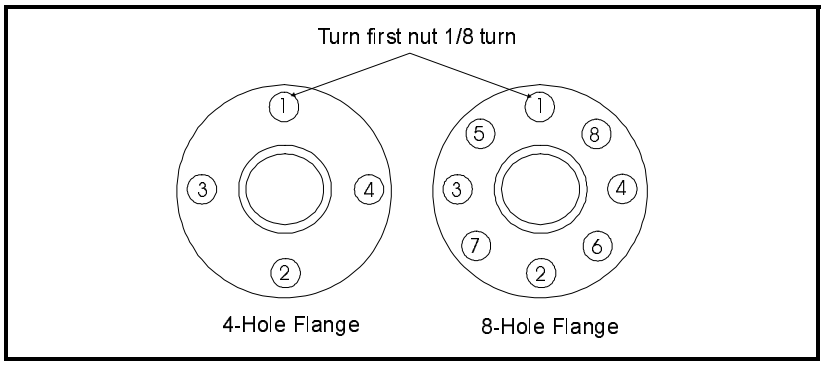
The nuts must be tightened and torqued in stages as described below.

1. Check the flange and buffer alignment again. Make sure the flanges are consistently parallel to each other.

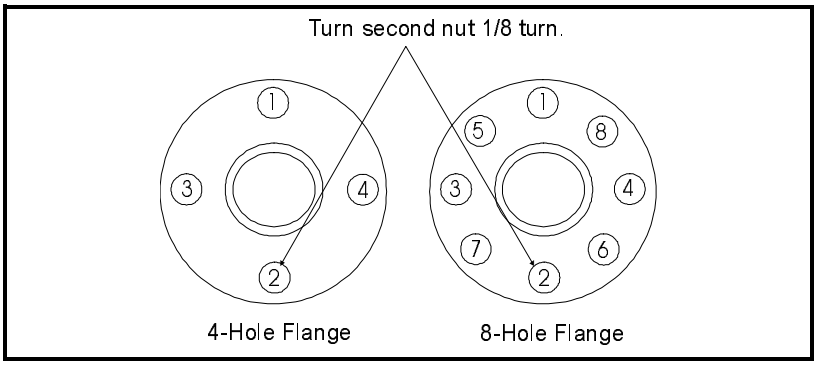


Torquing the Studs (cont.)

2. Using an adjustable wrench, turn the first nut 1/8 turn .



3. Turn the second nut 1/8 turn. The second stud should be diametrically opposite the first stud. Proceed to turn the remaining studs in the order shown below, or in a similar manner.



4. Turn each nut an additional 1/8 turn. TURN NUTS IN SEQUENCE.

Torquing the Studs (cont.)

5. Use Table 3-1 below to determine the appropriate torque.

Table 3-1:
Recommended Torque (using Kamprofile Gaskets)

Flange Rating	Stud Rating 4 Studs/ Flange	Stud Diameter (in.) x Length (in.)	Torque ft-lb (N-m)
316 Stainless Steel			
1 1/2" ANSI 150#	B8M,C,1	1/2" x 3 1/4"	56 (76)
1 1/2" ANSI 300#	B8M,C,1	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 600#	B8M,C,1	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 900#	B8M,C,1	1" x 6 "	107 (145)
1 1/2" ANSI 1500#	B8M,C,1	1" x 6"	107 (145)
Carbon Steel			
1 1/2" ANSI 150#	B7	1/2" x 3 1/4"	56 (176)
1 1/2" ANSI 300#	B7	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 600#	B7	3/4" x 4 3/4"	82 (111)
1 1/2" ANSI 900#	B7	1" x 6 "	107 (145)
1 1/2" ANSI 1500#	B7	1" x 6"	107 (145)

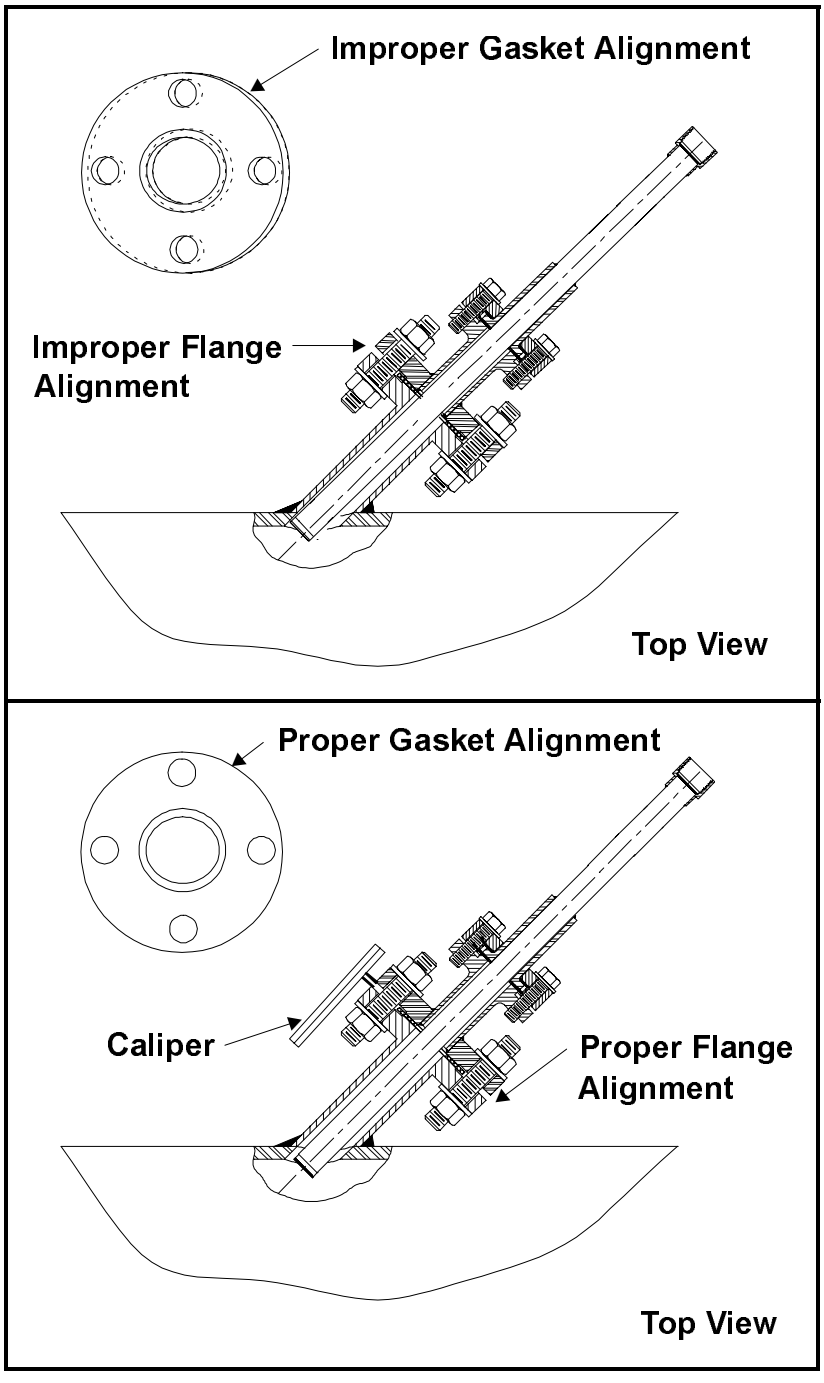
6. You must torque the flange nuts in three steps. Divide the appropriate torque by 3 to determine the three torque settings. For example, if the appropriate torque is 90 ft-lb, the three steps would be 30, 60, and 90 ft-lb.

7. Set the torque wrench for the first setting and torque the studs in sequence.

8. Repeat Step 7 with the second and third torque settings.

Torquing the Studs (cont.)

9. Check the flange alignment again to ensure that the flanges are parallel to each other. Measure the spacing between the flanges with the caliper on at least four equally distant points; the maximum tolerance is 0.2 mm difference between the four points. If you cannot achieve tolerance of 0.2 mm or less, replace the gasket with a new gasket, and repeat the entire procedure.



10. Repeat the above steps for additional flanges.

Installing the BWT Transducer

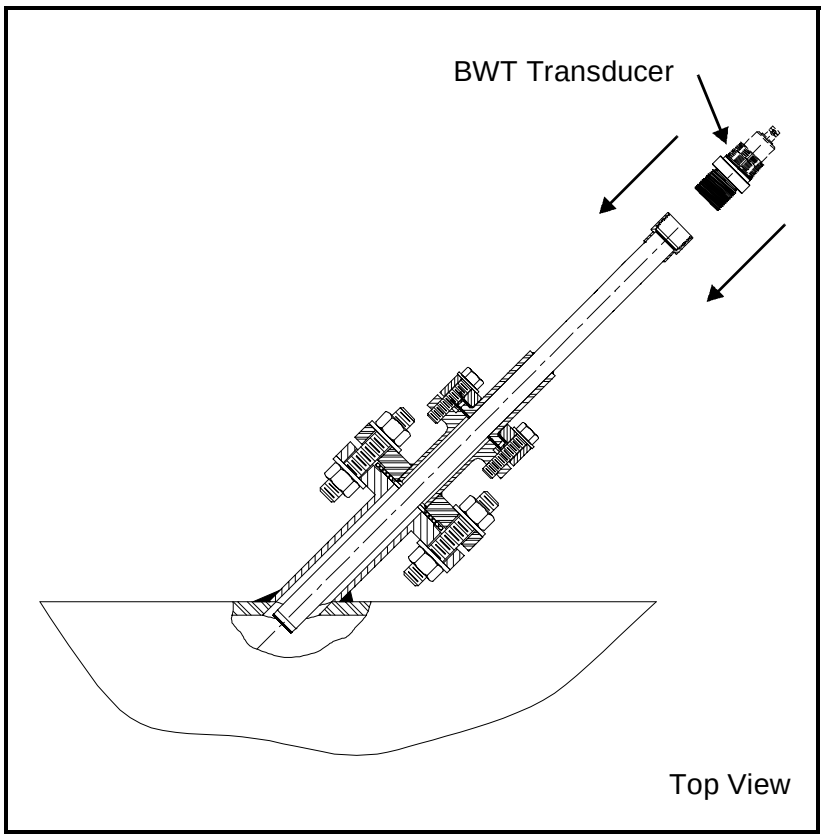
IMPORTANT: *After you install the BWT Buffer and transducers, you must allow the epoxy to cure for eight hours.*

Please read the following steps before installing the BWT transducer.

Note: *The typical minimum pressure should be 5 barg (75 psig) to see a signal at all. A higher pressure should give a better signal-to-noise ratio.*

1. Place a small droplet (2 mm in diameter) of 3M Epoxy or equivalent on the center of the end of the transducer.

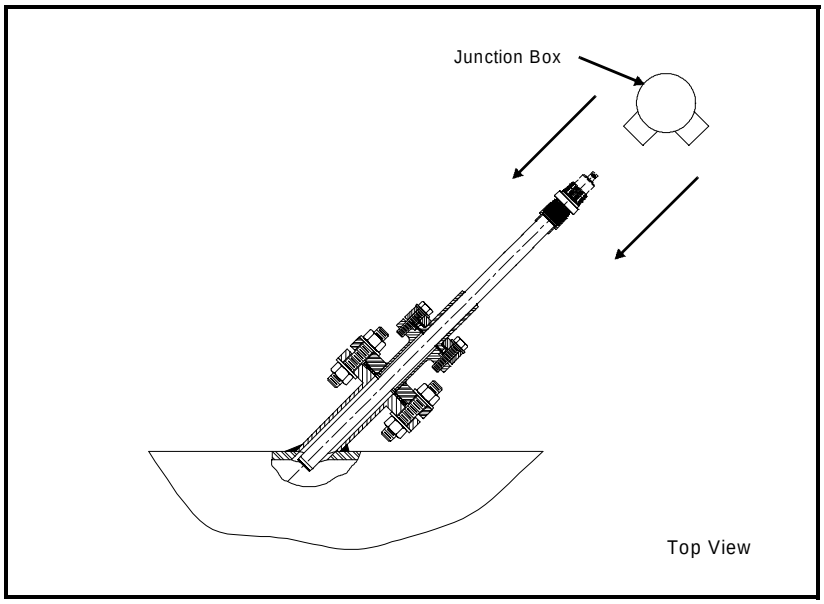
2. Screw the BWT transducer into the receptacle fitting at the end of the buffer. When the transducer begins to feel tight, stop turning it. Wait for a few seconds to give the couplant a chance to spread out.



3. Torque the transducer 15 to 18 ft-lb (20 to 25 N-m) DO NOT OVERTIGHTEN.

Installing the BWT Transducer (cont.)

4. Screw the junction box onto the BWT transducer.



5. Connect the transducer to the preamplifier and electronics as described in your user's manual.

6. Let the epoxy cure for 8 hours.

IMPORTANT: *After you install the BWT transducers, you must allow the epoxy to cure for 8 hours. You can power up the electronics; however, do not remove, re-torque or adjust the transducers.*

7. If you need additional acoustic isolation, refer to the following section. However, you should let the transducer epoxy cure before proceeding.

Verify that the measurements are the same or better after 8 hours, with the flowmeter diagnostics.

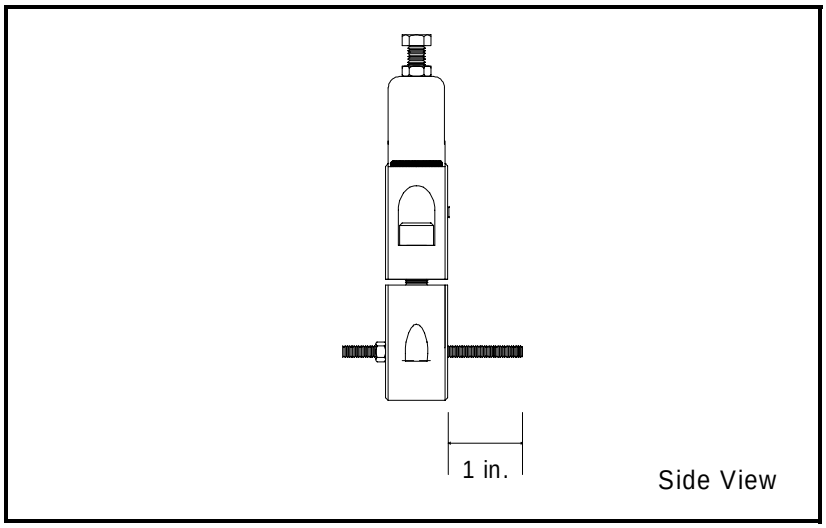
Caution!
Do not place insulation on or around the flange or buffer. The flange and buffer act as a barrier that protects the BWT from high temperatures.

Installing Additional Acoustic Isolation

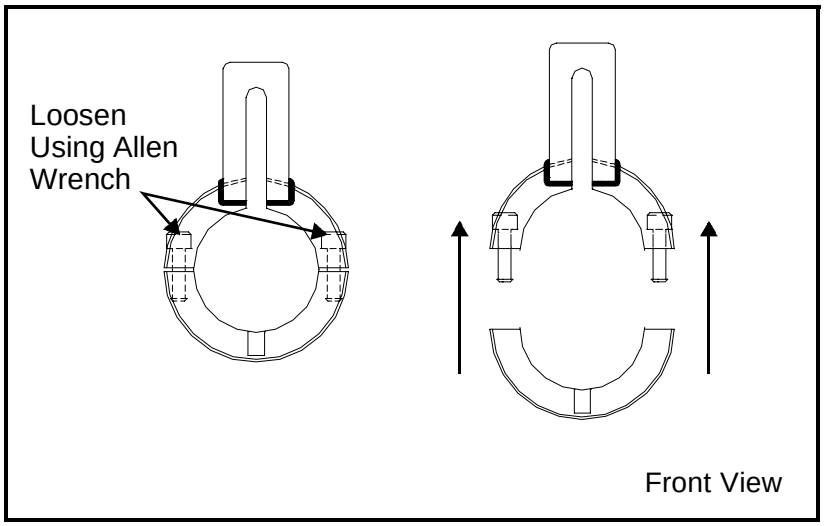
If your application requires additional acoustic isolation, you will need the following to perform this procedure:

- 1 to 3 pipe riser clamps (for 4 in. pipes or larger)
- Allen wrench

1. If you are using more than one clamp, adjust the spacing rods on each pipe riser fixture to 1 in. (25 mm). Use the drawing below to properly set the rods. When adjusting the rods, make sure you pay attention to how the clamps will be positioned on the buffer (i.e. how the clamps will face each other).

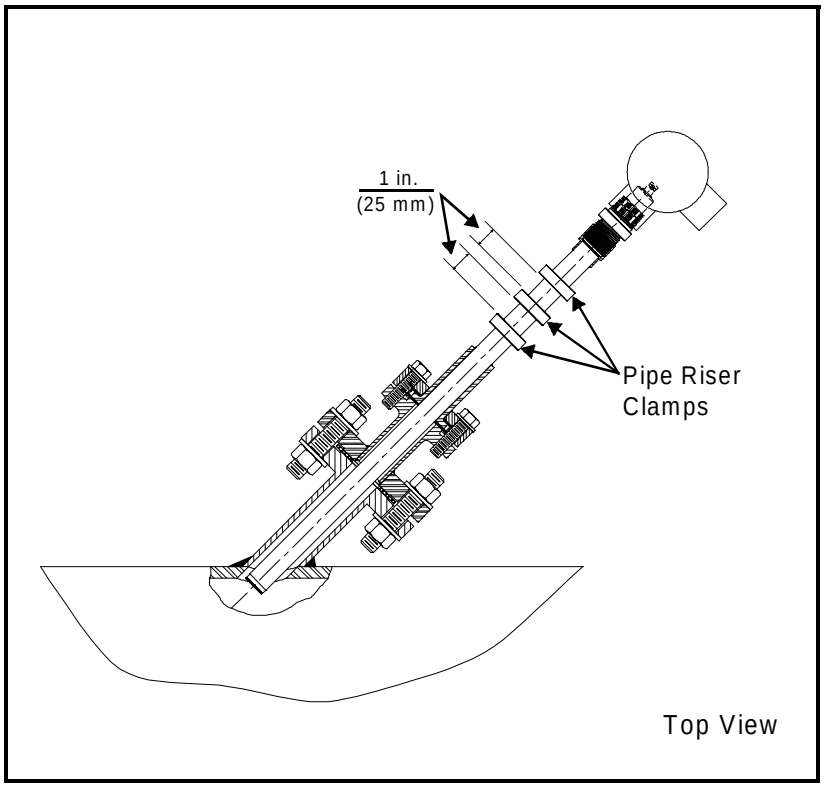


2. Use an Allen wrench to separate the two pieces of the clamp so that it can be placed on the buffer. Repeat for the other clamp(s). Be sure not to mix pieces from different fixtures.



Installing Additional Acoustic Isolation (cont.)

3. Place the clamp(s) on the buffer as shown below.



You have completed the installation. Refer to the *Startup Guide* of your user's manual for instructions on operation.

Chapter 4

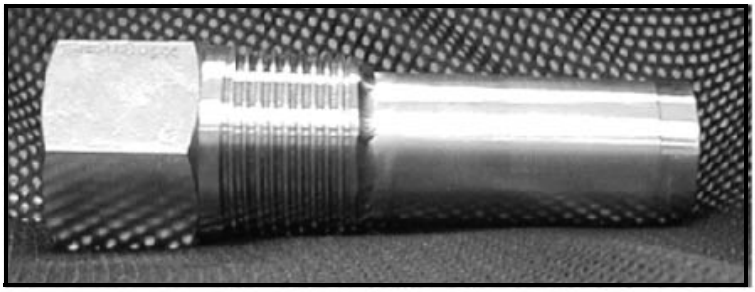
Installing Non-Flanged BWT Buffers (FSPA) and Transducers

Installing Non-Flanged BWT Buffers and Transducers 4-1

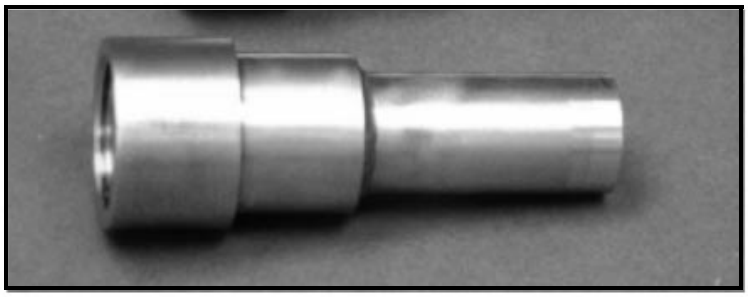
Installing Non-Flanged BWT Buffers and Transducers

The Non-Flanged BWT Buffer (FSPA) is a pipe plug and coupling assembly made of stainless steel. The FSPA is available with a threaded or socket-weld mount (see Figure 4-1 below).

Threaded buffers are screwed into the pipe coupling or nozzle while socket-weld buffers are welded into the pipe coupling. Both types of FSPAs enable you to install and remove transducers easily without interrupting the process or emptying the pipe.



Threaded Mount



Socket-Weld Mount

Figure 4-1: Threaded FSPA BWT Buffer

Installing Non-Flanged BWT Buffers and Transducers (cont.)

Procedure for Mounting BWT Transducers Using Threaded and Socket-Weld FSPA Buffers

!WARNING!
Follow all applicable safety codes and safety procedures when installing or removing the plugs.

1. **For threaded mounts** - Use a thread sealant on the buffer threads and screw the buffer into the flowcell transducer port using the appropriate torque.

   For socket-weld mounts - Insert the buffer into the flowcell transducer port and weld in accordance with all applicable safety codes and procedures.

!WARNING!
Welding should be performed by qualified personnel only. Safety personnel should be consulted.

2. Apply the epoxy couplant on the flat face of the BWT transducer and screw it into the buffer. Hand-tighten, then further torque to 50 ft-lb (70 N-m).

IMPORTANT: *Be sure to use an ultrasonic couplant on the face of the transducer before installing it into the buffer.*

PANAMETRICS WORLDWIDE OFFICES

PCI Division, 221 Crescent Street, Suite 1, Waltham, MA 02453-3497 USA
Telephone (781) 899-2746 • Toll-Free (800) 833-9438 • Fax (781) 894-8582
E-mail pci@panametrics.com • Web Site http://www.panametrics.com

ISO 9001
CERTIFIED

MAIN OFFICES:

USA
Panametrics, Inc.
221 Crescent St., Suite 1
Waltham, MA 02453-3497
USA
Telephone 781-899-2719
Toll-Free 800-833-9438
Fax 781-894-8582
E-mail pci@panametrics.com
Web Site www.panametrics.com
ISO 9001 Certified

Ireland
Panametrics Limited
Shannon Industrial Estate
Shannon, Co. Clare
Ireland
Telephone 353-61-470200
Fax 353-61-471359
E-mail info@panametrics.ie
ISO 9002 Certified

INTERNATIONAL OFFICES:

Australia
Panametrics Pty. Ltd.
P.O. Box 234
Gymea N.S.W. 2227
Australia
Telephone 61 (02) 9525 4055
Fax 61 (02) 9526 2776
E-mail panametrics@panametrics.com.au

Austria
Panametrics Messtechnik GmbH
Waldgasse 39
A-1100 Wien
Austria
Telephone +43-1-602 25 34
Fax +43-1-602 25 34 11
E-mail panametrics@netway.at

Benelux
Panametrics B.V.
Postbus 111
3870 CC Hoevelaken
The Netherlands
Telephone +31 (0) 33 253 64 44
Fax +31 (0) 33 253 72 69
E-mail info@panametrics.nl

France
Panametrics S.A.
BP 106
11 Rue du Renard
92253 La Garenne Colombes Cedex
France
Telephone 33 (0) 1 47-82-42-81
Fax 33 (0) 1 47-86-74-90
E-mail panametrics@panametrics.fr

Germany
Panametrics GmbH
Mess-und Pruftechnik
Robert-Bosch-Straße 20a
65719 Hofheim
Germany
Telephone +49-6122-8090
Fax +49-6122-8147
E-mail panametrics@t-online.de

Italy
Panametrics S.r.l.
Via Feltre, 19/A
20132 Milano
Italy
Telephone 02-2642131
Fax 02-26414454
E-mail info@panametrics.it

Japan
Panametrics Japan Co., Ltd.
2F, Sumitomo Bldg.
5-41-10, Koishikawa, Bunkyo-Ku
Tokyo 112-0002
Japan
Telephone 81 (03) 5802-8701
Fax 81 (03) 5802-8706
E-mail pci@panametrics.co.jp

Korea
Panametrics Korea Ltd.
Kangnam P.O. Box 1902
Seoul
Korea
Telephone 82-2-555-4611
Fax 82-2-556-4351
E-mail panakor@soback.kornet.nm.kr

Spain
Panametrics Instumentación S.L.
Diamante 42
28224 Pozuelo de Alarcon
Madrid
Spain
Telephone 34 (91) 351.82.60
Fax 34 (91) 351.13.70
E-mail info@panametrics.infonegocio.com

Sweden
Panametrics AB
Box 160
S147 23 Tumba
Sweden
Telephone +46-(0)8-530 685 00
Fax +46-(0)8-530 357 57
E-mail pana@panametrics.se

Taiwan
Panametrics Exim Ltd.
8F, No. 251, Min Hwa Road
Ku Shan District
Kaohsiung
Taiwan
Telephone 886-7-552-5498
Fax 886-7-552-3596
E-mail panaexim@ms11.hinet.net

United Kingdom
Panametrics UK Limited
Unit 2, Villiers Court
40 Upper Mulgrave Road
Cheam
Surrey SM2 7AJ
England
Telephone 020-8643-5150
Fax 020-8643-4225
E-mail uksales@panametrics.ie

1/29/02

USA

Panametrics, Inc.
221 Crescent Street, Suite 1
Waltham, MA 02453-3497
Telephone: (781) 899-2719
Toll-free: (800) 833-9438
Fax: (781) 894-8582
E-Mail: pci@panametrics.com
http://www.panametrics.com

Ireland

Panametrics Limited
Bay 148
Shannon Airport
Shannon
County Clare, Ireland
Telephone: 353-61-471377
Fax: 353-61-471359
E-Mail: info@panametrics.ie

PANAMETRICS